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Motor Pool Facility

Facility Environmental Monitoring Report

Calendar Year 2002

BROOKHAVEN
NATIONAL LABORATORY

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Brookhaven National Laboratory Motor Pool

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Summary of Results

Analysis of groundwater samples collected at the Motor Pool facility during 2002 indicates that chemical releases from historical operations continue to impact groundwater quality. As in previous years, the volatile organic compounds 1,1,1-trichloroethane, 1,1-dichloroethane, and methyl tertiary butyl ether were detected in several monitoring wells at concentrations above regulatory limits. Monitoring of the leak detection systems and the wells located downgradient of the Motor Pool's underground storage tank area indicates that the tanks and associated distribution lines are not leaking. All waste oils and used solvents from vehicle maintenance operations are being properly stored and recycled. Therefore, it is believed that the solvents detected in groundwater originate from historical vehicle maintenance activities at the Motor Pool, and are not related to current operations.

Background

The Motor Pool (Bldg. 423) and Site Maintenance facility (Bldg. 326) are attached structures located along West Princeton Avenue (Figure 1). The Motor Pool area consists of a five-bay automotive repair shop, which includes offices and storage space. The Site Maintenance facility provides office space, supply storage, locker room, and lunchroom facilities for custodial, grounds, and heavy equipment personnel. Both facilities have been in continuous use since 1947.

Potential environmental concerns at the Motor Pool include the past use of underground storage tanks (USTs) to store gasoline, diesel fuel, and waste oil; hydraulic fluids used for lift stations; and solvents used for parts cleaning. In August 1989, the gasoline and waste oil USTs, pump islands, and associated piping were upgraded to comply with Suffolk County Article 12 requirements for secondary containment, leak detection devices, and overfill alarms. Following the removal of the old USTs, there were no obvious signs of soil contamination. The present tank inventory includes two 8,000-gallon USTs used to store unleaded gasoline, one 260-gallon above-ground storage tank for waste oil, and one 3,000-gallon UST for Number 2 fuel oil. An inactive 275-gallon UST that was used for diesel fuel was removed in March 2002 (see Cunniff, 2002a). When the tank was removed, several small holes were discovered and fuel oil had leaked into the surrounding soil. Approximately 20 cubic yards of soil were removed. Although the endpoint sample smelled of petroleum, analysis of the sample did not detect any of the target compounds of concern. As an additional verification step, BNL collected groundwater samples in July from three of the existing groundwater monitoring wells located downgradient of the spill area (102-05, 102-06, and 102-10). Analysis of the groundwater samples did not indicate the presence of petroleum in groundwater except for low levels of methyl tertiary butyl ether (MTBE), a compound found in gasoline (Cunniff 2002b).

The Motor Pool facility has five vehicle lift stations. The hydraulic fluid reservoirs for the lifts are located above ground. In February 1998, hydraulic fluid was observed leaking from one of the lift stations (BNL Spill Number 98-14). The lift was excavated and soil below the lift was found to be contaminated with hydraulic oil. Approximately 50 cubic yards of the most contaminated soil were removed. In response to a New York State Department of Environmental Conservation (NYSDEC) request to evaluate whether the spill affected groundwater quality, BNL installed a monitoring well (102-09) inside the building, directly downgradient of the spill area. Hydraulic oil products were not detected in groundwater samples collected during 1999 (Zimmerman, 2000). Based on these findings, the hydraulic fluid spill was removed from NYSDEC's Active Spill List (Acampora, 2000).

The only environmental concern associated with the Site Maintenance facility (Bldg. 326) was the discovery in December 1996 of evidence of a historic oil spill directly south of the building (Figure 1). During the removal of an underground propane tank, the surrounding soil was found to be contaminated with petroleum products (BNL Spill Number 96-54). The site was excavated to the extent that the footings of the building were almost undermined. Although approximately 60 cubic yards of contaminated soil were removed, there was clear evidence that contaminated soil remained. In an effort to investigate the potential impact to groundwater quality, four wells were installed. Although groundwater monitoring detected the presence of the solvent TCA (1,1,1-trichloroethane) at concentrations above New York State Ambient Water Quality Standards (NYSAWQS), petroleum products were not detected in groundwater and the oil spill was removed from NYSDEC's Active Spill List (Acampora, 2000; Zimmerman, 2000).

Environmental Monitoring Program

In accordance with DOE Order 5400.1 (Environmental Protection), in 1996 BNL established a groundwater monitoring program at the Motor Pool facility's gasoline UST area to evaluate potential impacts to environmental quality from gasoline storage and dispensing operations. This monitoring program was expanded in 1999 to evaluate potential impacts from the two oil spills described above. The environmental monitoring program for the Motor Pool facility is described in the *BNL Environmental Monitoring Plan* (BNL, 2000; BNL, 2002). During 2002, six monitoring wells were used to evaluate groundwater quality.

Monitoring Results

Underground Storage Tank Area

The Motor Pool facility's groundwater monitoring program for the underground storage tank area is designed to confirm that the engineered and institutional controls in place are

effective in preventing contamination of the aquifer. Two wells (102-05 and 102-06) are used to monitor for potential contaminant releases from the UST area (Figure 1).

During 2002, MTBE was the only chemical related to gasoline products detected in groundwater downgradient of the gasoline UST area (Table 1). MTBE was detected in the July sample collected from well 102-06 at a concentration of 3.4 µg/L. The NYSAWQS for MTBE is 10 µg/L. Low levels of MTBE have been detected in these wells since 1997 (BNL, 1999). The solvent TCA was detected in both wells, but at concentrations well below the NYSAWQS of 5 µg/L. Since 2000, low levels of TCA and MTBE have been detected in well 102-06, and are probably related to small-scale spillage of gasoline during refueling operations and to historical parts degreasing operations at the Motor Pool facility (Figure 2). Wells 102-05 and 102-06 were also tested semiannually for the presence of floating petroleum hydrocarbons. As in previous years, no floating product was observed.

Building 423/326 Area

The groundwater quality downgradient of Bldg. 423 and Bldg. 326 is monitored using four wells (102-10, 102-11, 102-12, and 102-13). The program is designed to periodically assess existing solvent contamination that resulted from historical vehicle maintenance operations, and to confirm that the current engineered and institutional controls are effective in preventing additional contamination of the aquifer.

As in previous years, volatile organic compounds (VOCs) continue to be detected in wells downgradient of the Bldg. 423/326 area at concentrations that exceed NYSAWQS (Table 1, Figure 3). During 2002, TCA was detected in all four wells at concentrations ranging from 4.5 µg/L to 34.5 µg/L. In well 102-12, 1,1-dichloroethane (DCA) was detected at concentrations up to 6.2 µg/L. The NYSAWQS for TCA and DCA is 5 µg/L. The gasoline additive MTBE was detected in all four wells, with a maximum observed concentration of 40.8 µg/L. The NYSAWQS for MTBE is 10 µg/L. It is believed that the TCA and DCA originate from historical vehicle maintenance and part degreasing operations. MTBE has been used as a gasoline additive since 1977. This compound has been detected at low levels in the Motor Pool wells since the monitoring program began in 1996. The presence of MTBE in groundwater is likely due to small-scale spillage and historical vehicle maintenance activities.

Evaluation of Current Operations

Motor Pool operations were evaluated as part of the BNL Process Evaluation Project (Process ID: SM-550-VMO). The process evaluation found that all waste oils and used solvents generated from current operations are being properly stored and recycled. Two self-contained parts cleaners are located in the service shop. Automotive parts and tools are placed on trays in the cleaners, which are filled with a proprietary cleaning fluid called Safety Kleen. Used Safety Kleen is periodically replaced with clean fluid, and all spent fluid is taken off site for recycling by an outside vendor. The Process Evaluation findings support the suggestion that the TCA, DCA, and MTBE detected in groundwater are not related to current operations. Based on monitoring of the electronic leak detection

system monitoring, product reconciliation (i.e., an accounting of the volume of gasoline stored in USTs and the volume of gasoline dispensed) and groundwater monitoring, there are no indications that the underground storage tanks or associated piping are leaking. Furthermore, if the contaminants were related to a recent (significant) gasoline spill, one would expect that groundwater samples from wells directly downgradient of the USTs would contain very high levels of gasoline-related VOCs such as benzene, ethylbenzene, xylenes, toluene, and MTBE. This is not the case.

Future Monitoring Actions

The following actions are recommended for CY 2003:

- Maintain the groundwater monitoring program for the gasoline UST area on its current semiannual schedule, and test for floating product and VOCs.
- Maintain the groundwater monitoring program for the Bldg. 423/326 area on its current annual schedule, and test for VOCs.
- Because SVOCs (semivolatile organic compounds) have not been detected in groundwater samples collected to date, reduce the sampling frequency for SVOCs to once every two years for the UST area wells.

References

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Cunniff, L., 2002a. L. Cunniff to S. Mallette letter dated May 2, 2002. Building 326: 275-Gallon Steel Underground Storage Tank Removal.

Cunniff, L., 2002b. L. Cunniff to S. Mallette letter dated September 18, 2002. Follow-up Groundwater Sampling Down Gradient of Former Underground Storage Tank (BNL Tank #326-01) Located at Building 326.

Zimmerman, E.A., 2000. E.A. Zimmerman to G. Malosh letter dated January 5, 2000. *Groundwater Monitoring at the BNL Motor Pool and Site Maintenance Facility – NYSDEC Spill Numbers 96-11117 and 97-13266.*

Table 1 A. Volatile Organic Compound Analytical Results for CY 2002.

Well	Sample Period	1,1,1-TCA	1,1-DCA	MTBE
		(ug/L)		
Wells Downgradient of Gasoline UST Area				
102-05	March	2.0	<2.0	<2.0
	July	<2.0	<2.0	<2.0
102-06	March	1.3J	<2.0	<2.0
	July	<2.0	<2.0	3.4
Wells Downgradient of Building 423/326				
102-10	March	9.0	<2.0	15.4
	July	4.5	<2.0	<2.0
	September	8.5	<2.0	1.9J
102-11	September	33.0	5.3	34.7
102-12	September	34.5	6.2	40.8
102-13	September	16.1	1.7J	41.7
Typical MDL		2	2	2
NYSAWQS		5	5	10

J = Estimated value (below MDL)
MDL = Minimum Detection Limit
NYSAWQS = New York State Ambient Water Quality Standard

Table 1B. Semivolatile Organic Compound (SVOC) Analytical Results for CY 2002.

Well	Sample Period	SVOC Results
Wells Downgradient of Gasoline UST Area		
102-05	March	ND
	July	ND
102-06	March	ND
	July	ND
Wells Downgradient of Building 423/326		
102-10	March	ND
	July	ND
	September	ND
102-11	September	ND
102-12	September	ND
102-13	September	ND
Typical MDL		10 ug/L

ND = Not detected

Note: Upgradient well 102-08 was not sampled during 2002 because no other contaminant sources are located directly upgradient of this facility.

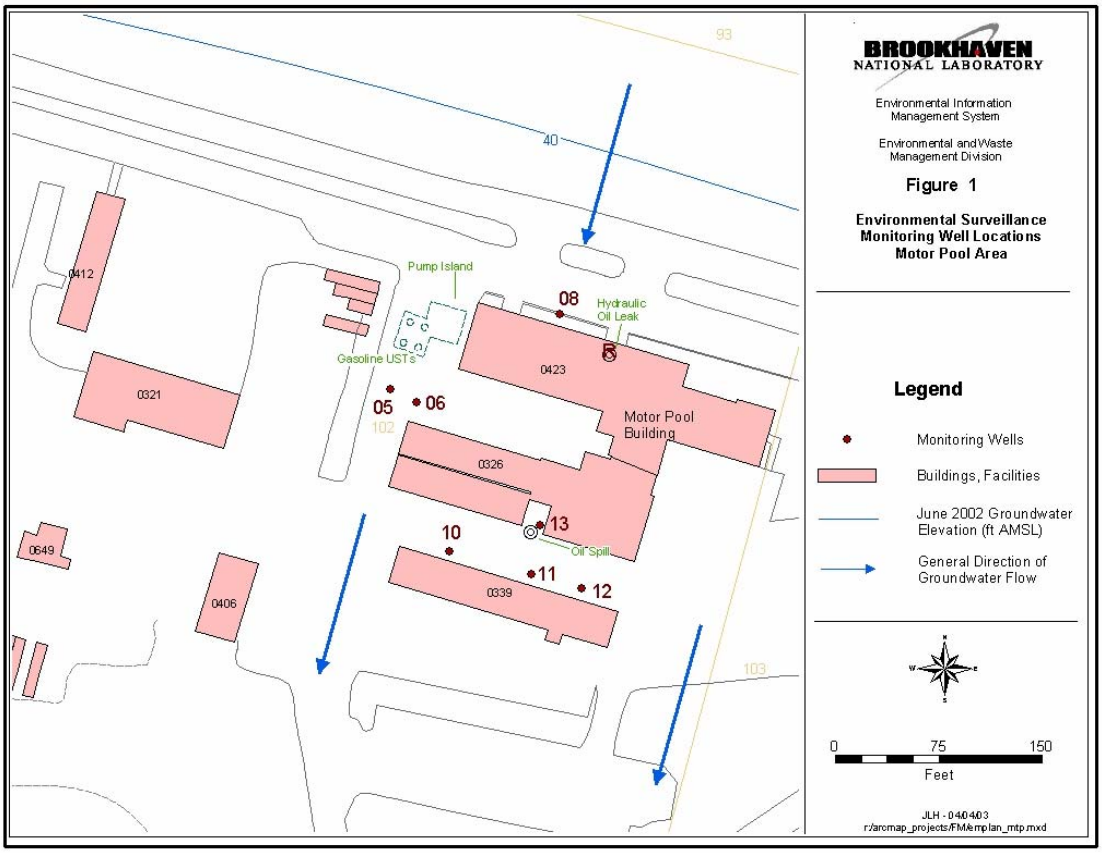

Figure 1: Locations of Monitoring Wells in the BNL Motor Pool Area.

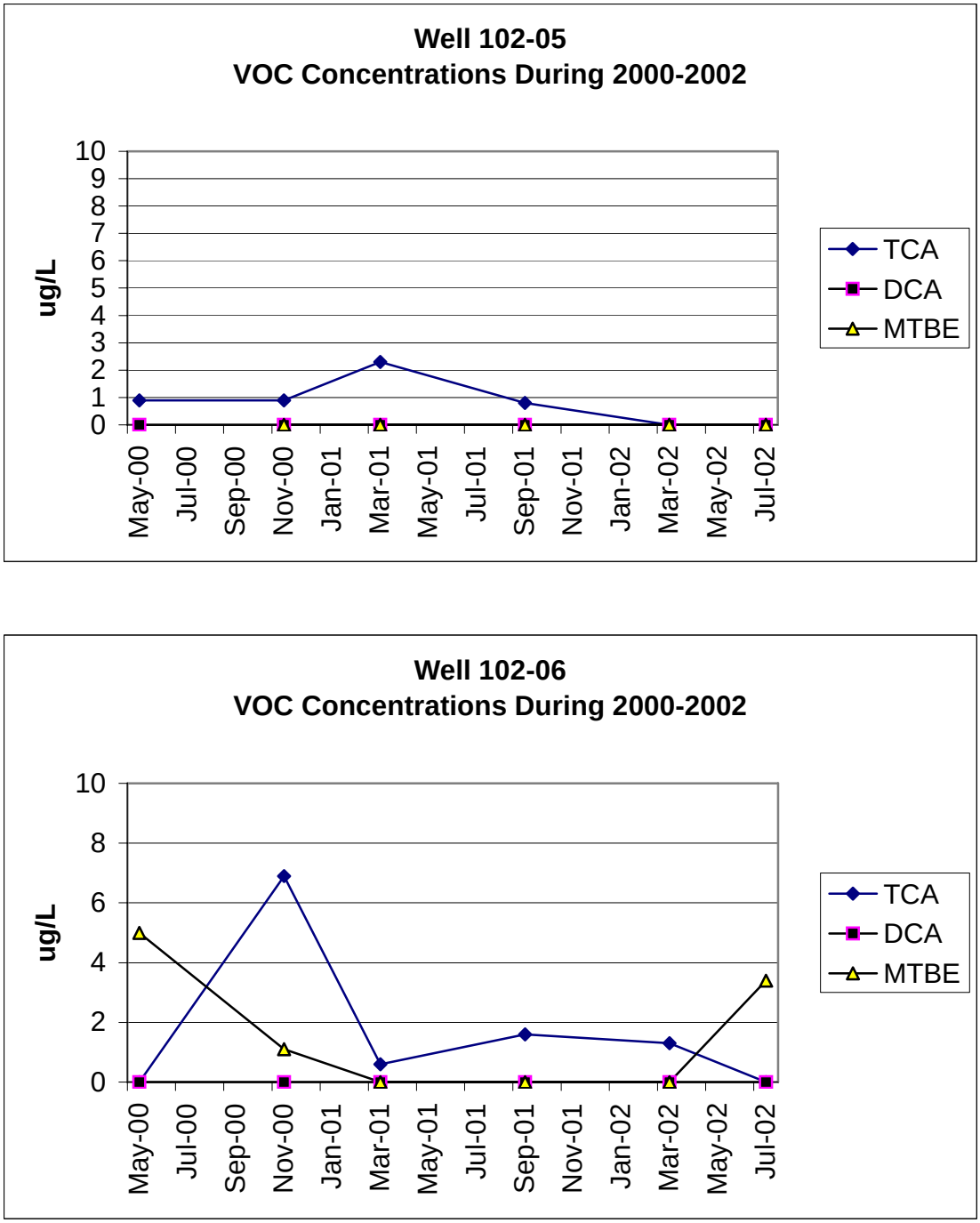

Figure 2: VOC Concentration Trend Plots for Monitoring Wells Downgradient of the Motor Pool's Gasoline UST and Pump Island Areas.

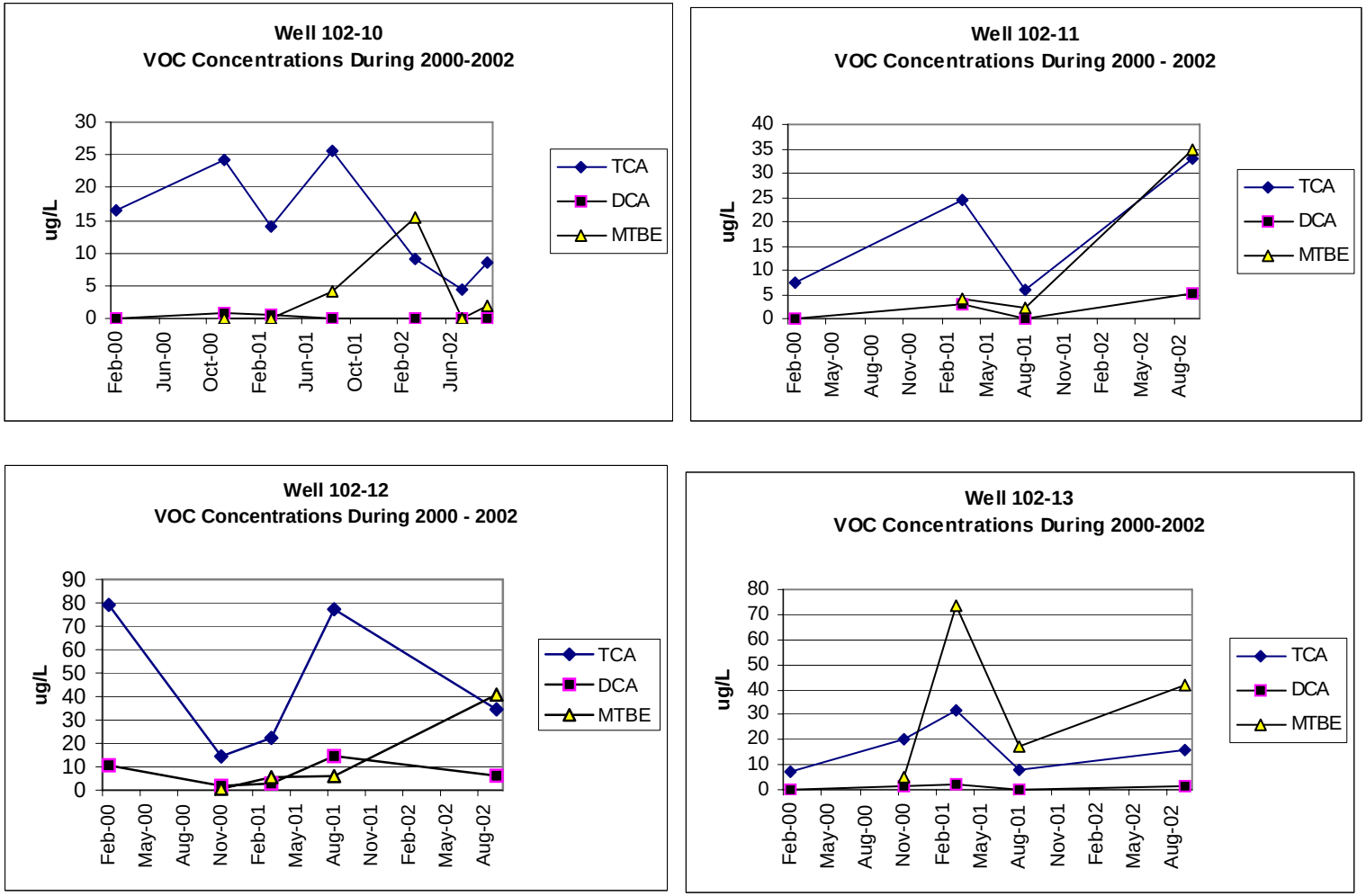

Figure 3. VOC Concentration Trend Plots for Monitoring Wells Downgradient of the Building 423/326 Area.